

WHAT IS CLAIMED IS:

- 1 An aluminum-coated structural member comprising:
 a steel substrate layer; and
 an Al-Si-Fe alloy layer formed on a surface of the steel
substrate layer, the alloy layer including a softer region having
5 a hardness smaller than or equal to a hardness of the steel
substrate layer, extending from the surface of the steel
substrate layer toward a surface of the alloy layer, and having
a thickness greater than or equal to 50% of a thickness of the
alloy layer, the Al-Si-Fe alloy layer having an oxide weight
10 smaller than or equal to 500 mg/dm².

2. The aluminum-coated structural member as claimed in
Claim 1, wherein the Al-Si-Fe alloy layer has a multi-layer
structure including an inner layer contiguous with the steel
15 substrate layer, and an outer layer forming the surface of the
alloy layer.

3. The aluminum-coated structural member as claimed in
Claim 2, wherein the inner layer is a softest layer in the multi-
20 layer structure.

4. The aluminum-coated structural member as claimed in
Claim 2, wherein the inner layer contains 85~95% Fe, and the
inner layer is softer in Hv hardness than an average hardness
25 of the alloy layer by a percentage more than or equal to 20%.

5. The aluminum-coated structural member as claimed in
Claim 2, wherein the multi-layer structure of the Al-Si-Fe alloy
layer further comprises an intermediate layer containing

25~40% Al, and the intermediate layer is lower in hardness than the steel substrate layer.

6. The aluminum-coated structural member as claimed in
5 Claim 2, wherein the multi-layer structure of the Al-Si-Fe alloy layer further comprises a plurality of intermediate layers, at least one of the intermediate layers containing 25~40% Al, and being lower in hardness than the steel substrate layer.
- 10 7. The aluminum-coated structural member as claimed in Claim 2, wherein the outer layer of the Al-Si-Fe alloy layer is harder than the steel substrate layer.
8. The aluminum-coated structural member as claimed in
15 Claim 2, wherein the outer layer contains 35~50% Fe.
9. An aluminum-coated structural member comprising:
a steel substrate layer; and
an Al-Si-Fe alloy layer formed on a surface of the steel
20 substrate layer, the Al-Si-Fe alloy layer having a multi-layer structure including an inner layer contiguous with the steel substrate layer, an outer layer forming a surface of the alloy layer and an intermediate layer formed between the inner and
25 intermediate layer containing 25~40% Al, and the outer layer being harder than the steel substrate layer.
10. A production method of an aluminum-coated structural member comprising:
30 heating a hot-dip aluminum-coated steel sheet at a heating rate in a range of 1~10°C/sec;

holding the hot-dip aluminum steel sheet at a raised temperature in a temperature range of $900\sim 950^{\circ}\text{C}$ for a duration in a range of $2\sim 8$ minutes;

5 cooling the hot-dip aluminum-coated steel sheet to a temperature in a temperature range of $700\sim 800^{\circ}\text{C}$ at a cooling rate in a range of $5\sim 15^{\circ}\text{C}/\text{sec}$;

forming the hot-dip aluminum-coated steel sheet into a predetermined shape in the temperature range of $700\sim 800^{\circ}\text{C}$; and

10 cooling the hot-dip aluminum-coated steel sheet in the predetermined shape rapidly from the temperature range of $700\sim 800^{\circ}\text{C}$ to a lower temperature lower than or equal to 300°C at a cooling rate in a range of $20\sim 100^{\circ}\text{C}/\text{sec}$.